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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Edward W. Sheridan

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EXAMINER

SAVAGE, JASON L

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/759,885	Applicant(s) SHERIDAN ET AL.	
	Examiner JASON L. SAVAGE	Art Unit 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 March 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-8 and 10-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-8 and 10-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1-03-08 has been entered.

Claim Objections

Claim 21 is objected to because of the following informalities: In claim 21, lines 4, the recitation that there is a layer of material containing metals which are substantially not in oxide form, namely (emphasis added)... is objected to since the limitation claim could be interpreted as being a preferred embodiment and not necessarily a required limitation. For the purposes of Examination, the claim has been treated as meaning "metals not in oxide form, wherein the metal compositions comprise... ". Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-8 and 10-21 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject

matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The limitation that the layer not in oxide form be selected from “non-adducted metal hydrides” is not described in the specification or claims as originally filed and is considered new matter. The mere absence of a positive recitation is not basis for an exclusion (See *Ex parte Graselli*, 231 USPQ 3693 (Bd. App. 1983), *aff’d mem.*, 738 F.2d 453 (Fed. Cir. 1984).

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-8 and 10-21 are rejected under 35 U.S.C. 103(a) as obvious over Danen et al. (US 5,266,132).

Danen teaches an energetic material comprising a plurality of layers **A** and a plurality of layers of materials **B** which are reactive with one another wherein the layers have thicknesses from between 1-1000 nm (col. 2, ln. 16-68 and Figure 1) which anticipates the range of the layer thickness being less than or equal to approximately 10 nm. Danen further teaches that the layers may comprise a metal such as aluminum and an oxide such as cupric oxide (col. 3, ln. 15-33).

Regarding the limitation that the layer in non-oxide form be selected from non-adducted metal hydrides and metals with interstitial hydrogen, Danen teaches that the reacting materials may include aluminum, titanium, magnesium, lithium and hydrides thereof (col. 5, ln. 9-44). Although Danen does not exemplify an embodiment wherein the metal hydride materials are non-adducted or contain interstitial hydrogen, it would have been within the purview of one of ordinary skill in the art to have selected any known metal hydride of the claimed metals with a reasonable expectation of success.

Absent a teaching of the criticality or showing of unexpected results of the metal hydride compounds being non-adducted metal hydrides, it would not provide a patentable distinction over the prior art.

Regarding claim 5, Danen teaches that layers A and B are adjacent to one another (Figure 1). In the alternative, although Danen teaches a buffer layer **b** is formed between them, Danen teaches that the buffer may be a self-buffering which results from an initial reaction between adjacent layers of the layers **A** and **B** (col. 3, ln. 15-33). As such, the composite of Danen would meet the limitation of layers **A** and **B** being adjacent to one another.

Regarding claims 7-8, 10-11 and 18-20, Danen teaches that the reacting materials may include aluminum, titanium, magnesium, lithium and hydrides thereof and that the oxide materials may include Fe (col. 5, ln. 9-44).

Regarding claim 12, the sputtering deposition of Danen (col. 3, ln. 43-62) would result in the same composite as that claimed by Applicant.

Regarding claim 13, Danen teaches composite may be formed on any conventional substrate material including those claimed by Applicant (col. 4, ln. 20-30).

Regarding claim 14, Danen teaches the composite is suitable for use in explosive applications (col. 1, ln. 9-15). As such, it would have been obvious to one of ordinary skill in the art to have employed energetic materials typically employed in explosive applications such as those claimed into the energetic material of Danen with a reasonable expectation of success.

Regarding claim 15, Danen teaches the same energetic material structure as that claimed by Applicant. Furthermore, Danen teaches the composite is suitable for use in explosive applications (col. 1, ln. 9-15). As such, one would expect that energetic fragments would form upon detonation just as that claimed by Applicant.

Regarding claim 16, Danen does not exemplify an embodiment wherein fragments of the detonated energetic material would comprise Mg and P. However, Danen does recite that Mg and the reaction product formed by reaction of Mg is suitable for use in the energetic material (col. 5, ln. 30-34). Absent a teaching of the criticality or showing of unexpected results from the detonated material containing some amount of P in the formed Mg containing fragments, it would not provide a patentable distinction over the prior art of Danen,

Regarding claim 17, the energetic material of Danen would be just as suitable for use in an anti-tamper device as the energetic device claimed since Danen teaches the same structure which is claimed.

Response to Arguments

Applicant's arguments filed 1-2-08 have been fully considered but they are not persuasive.

Claim Objection

Applicant states that claims have been amended to clarify the limitation to overcome the claim objection. However, claim 21 is still objected to due to the use of "namely".

Claim Rejections – 35 USC 112

Applicant argues that non-adducted metal hydrides is inherent in the disclosure and figures, particularly Figure 4, page 4 lines 22-23 and page 5, lines 20-25. However, Figure 4 shows metal atoms 50 and hydrogen atoms 52. There is no recitation of the metals being non-adducted. Furthermore, the recited portions on pages 4 and 5 recite the liberation or release of hydrogen gas. As evidenced by Danen, liberation of a reaction product of hydrogen gas can occur through the use of adducted hydrides (col. 5, ln. 36 - col. 6, ln. 2). As such, the assertion that the disclosure provides an inherent basis for the claim limitation of a non-adducted metal hydride is not persuasive.

Claim Rejections – 35 USC 103(a)

Regarding the claim rejections under 35 USC 103 to Danen, Applicant argues on page 8 of the Amendment that the process of adducting a hydride would greatly reduce the hydrogen gas formation per unit volume of composition and that the present

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invention maximizes the hydrogen gas formation. This argument is not commensurate in scope with the claims.

Applicant further argues that the obviousness of the use of pure metal hydrides is only seen after recognition that optimizing hydrogen content is of value and that Applicant's invention is based on the optimization of hydrogen content in a thermitic composition. This argument is not commensurate in scope with the claims which recite a layer comprising the non-adducted metal hydrides and a layer comprising a metal substantially in oxide form having the claimed thickness. Furthermore, as recited in the rejections, Danen teaches reacting materials including aluminum, titanium, magnesium and lithium. Danen further teaches hydrides such as an aluminum hydride adduct and the formation of reaction products releasing hydrogen gas (col. 5, ln. 25 - col. 6, ln. 2). As such, the claimed materials and hydrides thereof such as aluminum hydride is taught. It would have been within the purview of one of ordinary skill in the art to have selected any known metal hydride as a material layer in the energetic material of Danen with a reasonable expectation of success.

Applicant also argues that Applicant's disclosure is fundamentally a different form of matter that only two layer systems are necessary to be a gas former, a metal hydride and an oxidizer. Applicant further states that the adducted metal hydride described by Danen would not result in a self propagating reaction when used only with the CuO. These arguments are not commensurate in scope with the claims as the claims recite an energy dense energetic material comprising (emphasis added) which would allow for more than two layers of materials and there is no limitation drawn to a self-propagating

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reaction. Furthermore, Danen would read on such limitations were they present in the claims as it recites that the energetic material may be formed by a layer of one reactant being laid down upon the other (2 layer system) although the two layers would partially react forming a self-buffering layer between the two layers (col. 3, ln. 1-4 and 26-33).

Danen further teaches that the reaction is self-propagating and that after reaction is initiated, the reaction of a first pair of reactive layers will cause other layers to react (col. 4, ln. 31-37).

Applicant argues that self propagation is a distinguishable and critical difference between Applicant's invention and Danen. For the reasoning set forth above, this argument is not persuasive.

Applicant also argues that the language "and hydrides thereof" does not appear in the referenced patent and is not taught, anticipated or inferred. As described above, Dannen teaches the claimed reacting metals. Danen further teaches a hydride of the metals which is aluminum hydride. As such, Dannen is viewed as teaching the claimed metals and hydrides of the metals.

Applicant further states that the adducted hydride as disclosed by Danen could not be formed by sputtering deposition and would have to be by chemical vapor deposition which provides a distinct manufacturing difference between what Danen teaches and the claims of the disclosure. This argument is not persuasive since only claim 21 has limitations drawn to the method of forming the article and the limitations merely recite 'depositing a layer'. As such, Applicant's assertion that Danen would need to use a

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chemical vapor deposition method to form the hydride would still meet the limitation of 'depositing a layer...'.

Applicant further asserts that adducted metal hydrides will not form a self propagating reaction. For the reasoning set forth above, this argument is not persuasive. The further assertion that there is a substantial difference in the work potential of the materials is not commensurate in scope with the claims.

Related Prior Art

The following is a listing of prior art which is deemed pertinent to the present invention:

Nielson et al (US 6,224,099) teaches an energetic materials comprising metal materials including hydrides and oxidizing materials including materials such as RDX (col. 3, ln. 50-67).

Hinshaw et al. (US 5,439,537) teaches an energetic material comprising metal material and an oxidizing agent to form oxide portions. Hinshaw further teaches that hydrides of the metal may be employed in the energetic material (col. 3, ln. 25-48).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASON L. SAVAGE whose telephone number is (571)272-1542. The examiner can normally be reached on M-F 6:30-4:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keith Hendricks can be reached on 571-272-1401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jason Savage/
3-14-08

/KEITH D. HENDRICKS/
Supervisory Patent Examiner, Art Unit 1794